

**REPORT TO THE
TWENTY-FIFTH LEGISLATURE
STATE OF HAWAII**

**WORK PLAN FOR GREENHOUSE GAS
EMISSIONS REDUCTIONS**

**UNDER SECTION 7, ACT 234, 2007 SESSION LAWS,
REQUIRING
THE GREENHOUSE GAS
EMISSIONS REDUCTION TASK FORCE
TO SUBMIT A WORK PLAN
AND PROPOSED REGULATORY SCHEME,
ALONG WITH ANY PROPOSED LEGISLATION**

**PREPARED BY:
THE GREENHOUSE GAS
EMISSIONS REDUCTION TASK FORCE
STATE OF HAWAII**

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1. Introduction

The Legislature has determined that Hawaii must do its share in reducing global greenhouse gas emissions. Although Hawaii's total emissions are a small part of the world's output, its per capita emissions are similar to other U.S. states. Section 7 of Act 234, 2007 Session Laws of Hawaii ("Act 234" or the "Act"), requires the Greenhouse Gas Emission Reduction Task Force (Task Force) to submit to the Legislature 20 days before the 2010 legislative session, a work plan and regulatory scheme, and any proposed legislation (collectively here, Work Plan), for achieving the maximum practically and technically feasible and cost-effective reductions in greenhouse gas (GHG) emissions from sources or categories of sources of greenhouse gases to at or below 1990 levels of emissions by the year 2020. The Work Plan includes this document (specifying the Task Force Recommendation), the attached consultant's report, response to public comments, and other exhibits.

To develop the Work Plan, the Task Force worked with the consulting group ICF International (ICF), administered through the Department of Business, Economic Development and Tourism (DBEDT), to produce various reports. In 2008, ICF produced an updated inventory of 1990 GHG emissions as required by section 3 of Act 234 to set the target for reductions. To determine the magnitude of the needed emissions reduction, ICF also compiled an inventory of 2007 emissions, the latest year feasible. In 2009, ICF produced an assumptions report (to inform a reference case projection of "business as usual") and the attached "Proposed GHG Reduction Work Plans for Hawaii" (ICF Work Plans Report, November 10), , which provides details on four alternative scenarios for greenhouse gas reduction within the State (titled Work Plan #1, #2, and #3). Work Plan #1 assesses the impact to the State of implementing the Hawaii Clean Energy Initiative (HCEI) plus additional policies, Work Plan #2 a state-level carbon tax, and Work Plan #3 the proposed federal cap-and-trade program (in its current legislative form). The ICF Report also provided estimates of the Hawaii greenhouse gas emissions under a 'business as usual' scenario ("Reference case"). DBEDT administered the contract with ICF and spent \$500,000 of the \$1,000,000 appropriated for Act 234 work, mostly for ICF's emissions inventory update, assumptions book, and ICF Work Plan(s) Report.

The Task Force and its committees held open, monthly meetings, posted materials on <http://hawaii.gov/dbedt/info/energy/greenhouse>, and, in November 2009, held public workshops on the proposed Work Plan in Lihue, Kahului, Hilo, Kona, and Honolulu.

Act 234 commits the State to achieve 1990 levels or beyond of greenhouse gas emissions by the year 2020. Act 234 specifies that emissions from aviation and international fuels be excluded. Using national and international standards for greenhouse gas emissions accounting, emissions in the year 1990 are estimated to be 13.660 megatonnes¹ [million metric tons] of carbon dioxide equivalents

¹ 1 megatonne = 1,000 kilotonnes. 13.660 MMCO₂e=13,660 ktCO₂e. The ICF Report uses "MM" on some tables synonymously with "Mt."

(MMCO₂e). In 2007, Hawaii emitted about 15.487 MMCO₂e². These numbers include long-term carbon storage features, such as managed forests (sinks). To meet Act 234 requirements, Hawaii must reduce covered emissions by about 12% (or 1.827 MMCO₂e) below 2007 levels by the year 2020.

2. Summary of Task Force Recommendation

The Task Force unanimously recommends that the Legislature strongly support Work Plan #1, the Hawaii Clean Energy Initiative (HCEI)³ with additional specified policies (hereby called HCEI+). HCEI+ meets and surpasses the GHG emissions reduction target by an estimated 39% providing that its elements are met on time (see Table 2).

The majority of the Task Force (seven of ten)⁴ recommends that the Legislature enact laws to implement and assure that HCEI+ meets its schedule in a timely manner. Some major areas of law-making will include electricity, transportation, support for the Public Utilities Commission, rule-making within the Department of Health, mitigation of impacts to disproportionately impacted households, and monitoring and compliance over time (see sections 3a to 3e below).

The majority of Task Force members (seven of ten)⁵ strongly recommend there be additional assurances, incentives, and policy mechanisms for HCEI+ to become a reality on time. This set of the Task Force recommends that the cost of HCEI+ be more explicitly identified (see section 4 of this report, *Additional Questions and Research Needs*) and that the Legislature arrange for the funding of HCEI+ both in terms of staff/coordinating efforts and large infrastructure projects. Funding may include a variety of mechanisms such as private investment, user/consumer fees, and state and federal taxes. Funding should take into account any federal laws and funding mechanisms.

² 15.487 MMCO₂e with aviation & international fuel excluded. 20.326 MMCO₂e with them included.

³ HCEI seeks to achieve 70% clean energy use in Hawaii by 2030, up from less than 10% in 2007. Sub-targets include 40% use of renewable energy for electricity generation and 30% use of efficiency measures.

⁴ This subset of Task Force members includes Mr. Laurence Lau (Department of Health), Mr. Theodore Liu (Department of Business, Economic Development, and Tourism), Mr. Mark Fox (The Nature Conservancy), Dr. Makena Coffman (University of Hawaii at Manoa, Department of Urban and Regional Planning), Professor Maxine Burkett (University of Hawaii at Manoa, Richardson School of Law), Mr. Robbie Alm (The Hawaiian Electric Company, Inc.), and Mr. Jeff Mikulina (Blue Planet Foundation).

⁵ This subset of Task Force members includes Mr. Laurence Lau (Department of Health), Mr. Theodore Liu (Department of Business, Economic Development, and Tourism), Mr. Mark Fox (The Nature Conservancy), Dr. Makena Coffman (University of Hawaii at Manoa, Department of Urban and Regional Planning), Professor Maxine Burkett (University of Hawaii at Manoa, Richardson School of Law), Mr. Robbie Alm (The Hawaiian Electric Company, Inc.), and Mr. Jeff Mikulina (Blue Planet Foundation).

The majority of Task Force members (seven of ten)⁶ suggest that a variety of assurance mechanisms be explored in order to act as a “backstop” (i.e. ensuring HCEI+ becomes a reality). For example, enforceable penalties could be added to the ACT 155 (2009) energy efficiency portfolio standard and renewable energy portfolio standard; greenhouse gas emissions limits that achieve the Act 234 target could be imposed via rules developed by the Department of Health on sources and categories of sources.

Four Task Force members⁷ suggest that a carbon tax could act as a “backstop” mechanism, i.e. it would take effect if HCEI+ does not meet identified conditions (triggers). For example, if a condition were not met, the law would impose a price floor on carbon or a carbon tax. Similarly, a “barrel tax” could also provide a funding mechanism for projects and implementation.

Four Task Force members⁸ strongly recommend that there be a carbon tax in order to: 1) Provide incentives and a funding source to achieve HCEI+ goals; and 2) Help mitigate impacts to disproportionately burdened households. The level and scope of tax should be determined by further study. This set of Task Force members recommends that a state-level carbon tax be implemented promptly (not to wait for federal policies). This is seen as beneficial because there 1) is an urgent need to support HCEI+ objectives, 2) is uncertainty about the future (particularly in timing) of federal greenhouse gas emissions policy and 3) establishing a statewide accounting system will help with future compliance.

Some Task Force members recommend there be flexibility in the treatment of the carbon tax depending on the form of future federal greenhouse gas emissions legislation. For example, depending on the federal program’s impact to Hawaii, it may be possible that the scope of the carbon tax be redefined so as to avoid “double-taxation.”

One member⁹ strongly believes that achieving HCEI goals will be difficult if Hawaii needs to pay for HCEI as well as “pay into” a national cap-and-trade

⁶ This subset of Task Force members includes Mr. Laurence Lau (Department of Health), Mr. Theodore Liu (Department of Business, Economic Development, and Tourism), Mr. Mark Fox (The Nature Conservancy), Dr. Makena Coffman (University of Hawaii at Manoa, Department of Urban and Regional Planning), Professor Maxine Burkett (University of Hawaii at Manoa, Richardson School of Law), Mr. Robbie Alm (The Hawaiian Electric Company, Inc.), and Mr. Jeff Mikulina (Blue Planet Foundation).

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⁸ This subset of Task Force members includes Dr. Makena Coffman (University of Hawaii at Manoa, Department of Urban and Regional Planning), Professor Maxine Burkett (University of Hawaii at Manoa, Richardson School of Law), Mr. Robbie Alm (The Hawaiian Electric Company, Inc.), and Mr. Jeff Mikulina (Blue Planet Foundation).

⁹ Mr. Robbie Alm (The Hawaiian Electric Company, Inc.)

system. This member strongly urges avoiding “double-taxation” (as discussed above) and, more specifically, that a state-level carbon tax, in *place of* rather than *in addition to* a federal cap-and-trade program, is the fairest way to spread costs and address specific groups such as low-income households and perhaps agricultural activities.

Three Task Force members¹⁰ support HCEI+ if it proceeds without additional intervention or implementation of “assurance measures,” as discussed above, and strongly object to a carbon tax or price floor on carbon. These members note that the goals of Act 234 would be achieved under the reference case and that Act 155 (2009) standards have already updated the reference case.

One member of this set¹¹ would be willing to explore the possibility of a state-level carbon tax after the resolution of federal greenhouse gas emissions policy, depending on its future form and impacts to Hawaii.

One member of this set¹² additionally objects to a “barrel tax.”

Other recommendations include:

- Expand the mandate of the Public Benefits Administrator beyond electricity.
- For mobile sources, begin by relying on proposed federal standards (35.5 miles per gallon by 2016), and then adopt California’s Pavley II standards (42 miles per gallon by 2020).
- Provide a monitoring system that makes sure that reductions and offsets are verifiable.
- Support and promote early and continual upgrading and compliance with of building and land use codes to promote a better built-environment for individual buildings, communities, towns and cities.
 - Buildings may easily last from 30 to 50 years and thus energy efficient codes should be adopted quickly; land use laws including zoning for mixed-use, compact development, and the reduction of sprawl, affect transportation particularly and are critical for long-term GHG reductions.
- Include life-cycle analyses of GHG emissions as a standard feature for the planning and design of significant projects and policies.
- Foster public engagement, awareness and education of Hawaii’s energy and greenhouse gas issues and impacts.
- Consideration of opportunities for carbon sequestration, offsets and other co-benefits from reforestation and certain agricultural management practices.

¹⁰ This subset of Task Force members includes Mr. Frank Clouse (Refinery Industry Representative), Mr. Gary North (Maritime Industry Representative), and Mr. Gareth Sakakida (Transportation Industry Representative).

¹¹ Mr. Frank Clouse (Refinery Industry Representative).

¹² Mr. Gareth Sakakida (Transportation Industry Representative).

- The impacts to Hawaii from any potential federal greenhouse gas law should be further analyzed as policies unfold, including the potential of Hawaii to meet future greenhouse gas emissions targets in a cost-effective manner.

3. Discussion of Recommendation based on Identified Work Plans

The Task Force considered four scenarios, developed by ICF, that meet the Act 234 target, provided that the specified laws, policies, and programs are met on time. This timeliness requirement is a critical condition for success. The ‘reference case’ scenario projects emissions based on a business as usual trajectory, which incorporates existing laws and policies. The three alternative Work Plans are developed in comparison to the reference case and each other. Work Plan #1 is HCEI+, recommended above. Work Plan #2 is based on Work Plan #1 and adds a state carbon tax that would apply to “residual” carbon in covered fuel sources. Work Plan #3 is also based on Work Plan #1 and models the effects of a federal cap-and-trade bill, currently known as ACES or Waxman Markey passed by the U.S. House of Representatives in 2009. The details of the work plans are provided in the attached ICF Work Plan Report.

The work plans (and recommendation) address many of the factors specified in section 6 of Act 234 as specified in this Table 1.

Table 1. Legislative Requirements and Work Plan Status

Act 234, Section 6, Requirement	Status
(1) consultation with agencies	Covered in attached ICF work plants report
(2) identification and recommendation of measures and mechanisms for reduction, compliance, and incentives	In ICF report
(3) consideration of programs in other locations	In ICF report
(4) Find and develop analytical tools and models.	In ICF report
(5) contributions of sources, adverse effects on small businesses, minimum thresholds	In ICF report (except minimum thresholds)
(6) voluntary reduction opportunities	In ICF report
(7) market based mechanisms, cumulative impacts, effects on other pollutants	In ICF report
(8) Suggested rules for market mechanisms and reporting	Discussed in this report; specific rules are not proposed. Meeting the GHG target depends on meeting reference case or Hawaii Clean Energy Initiative (HCEI) and other policies in a timely manner
(9) Suggested mobile source regulations	Discussed in this report; suggested regulations are not proposed. Federal and California proposals are discussed in ICF report
(10) Minimize “leakage”	Discussed in ICF report; noted in this report as an important component of future energy laws (section 3)
(11) Suggest fees	Discussed in this report; fees are not proposed

	either generally or specifically. A state carbon tax and possible costs of a federal cap and trade proposal (Waxman-Markey) are discussed in ICF report. More research is needed.
(12) Public workshops	Done in November 2009. Summaries of workshops are attached as Exhibit A

The Task Force believes that the strong, broad support for the HCEI will continue because it is strongly in the state's interest and thus included HCEI in each work plan. Because it believes that HCEI will continue, the Task Force did not ask ICF to model a state carbon tax by itself. Because Hawaii is a small economy, the Task Force deemed it inappropriate to pursue a state-level cap-and-trade program and thus Work Plan #3 models the impact of the proposed federal program to Hawaii. Details of the elements in the three work plans are set out in Appendix B: Policy Modeling Assumptions, of the ICF Work Plan Report. Some major elements of the three work plans are set out in Table 2.

Table 2. Work Plans' Selected Elements

Policy	Description	CO2e Reduction in 2020
<i>HCEI, Part of Work Plans #1, 2, 3</i>		
Additional Renewable Power Generation & Biodiesel for Power Plants (paid by ratepayers)	HCEI, 2008 Energy Agreement elements 839 MW by 2020 5,820 GWh by 2030	Total approx. 4,607 kt: New generation: 3469 kt Biodiesel: 1135 kt
Wind Farm, Lana'i	200 MW by 2013	
Wind Farm, Moloka'i	200 MW by 2013	
Undersea Cable	Lana'i, Moloka'i, Oahu by 2013 (maybe Maui later)	
Other renewable generation projects, HECO owned	308 MW by 2015 (biofuels)	
Other renewable generation projects, not HECO owned	168 MW by 2020	
Sea Water Cooling	2 projects – Honolulu by 2015 Waikiki (date unknown)	126 kt
Plug in Hybrid Electric Vehicles (PHEV's)	2010 start – reaching 2% of new vehicles by 2020	56 kt
<i>Additional Policies (“+”), Part of Work Plans #1, 2, 3 but became law & would be part of future reference case¹³</i>		
Renewable Portfolio Standard (RPS) Act 155/2009	25% of electricity sales by 2020 (5% above reference case)	244 kt
Energy Efficiency Portfolio Standard (EEPS) Act 155/2009	20% electricity reduction by 2020 4,300 GWh of savings by 2030 Interim GWh targets to be set by the PUC	1,580 kt
<i>Additional Policies (“+”), Part of Work Plans #1, 2, 3 and are NOT law yet</i>		
Increased Vehicle Efficiency (average new vehicle)	35.5 mpg in 2016 to 42.4 mpg by 2020	27 kt
Building Codes	2010 - 30% over current, 2014 - 50% over current, then 5% every 3 years	715 kt
<i>State Carbon Tax, Part of Work Plan #2</i>		
	\$10/tonne in 2010 to \$40/tonne by 2020 Covers “residual” carbon content of all fossil fuels. Excludes non-energy emissions & feed stocks	<50 kt

¹³ The reference case and work plan #1 elements are somewhat out of date. Due to the timing of the completion of the ICF report relative to the end of the 2009 Legislative Session, it was decided not to consider as part of the reference case certain legislation that was later enacted but instead included such legislation in Work Plan 1 (HCEI+). These 2009 legislative acts are on the Renewable Portfolio Standard, Energy Efficiency Portfolio Standard, and Alternative Fuel Standard; (Table ES-3 of the ICF report), will result in further reductions in greenhouse gas emissions beyond what is attributed to the reference case whether or not any of the three work plans are adopted (i.e., they should now be considered as part of “business as usual”).

<i>Federal Cap & Trade, Part of Work Plan #3</i>		
ACES/ Waxman-Markey 2009	\$20/tonne in 2012 to \$35/tonne in 2020	20 kt

The Task Force strongly recommends support for Work Plan #1, HCEI+. Although the reference case (by a relatively small margin) meets the requirements of Act 234, the majority of the Task Force recommends HCEI+ because greater emission reductions are not only found to be economically beneficial to the State, but are also likely to be necessary or required in later years by federal law. As such, there are clear advantages to early and aggressive greenhouse gas emissions reductions. HCEI+ provides for greater energy security, to Hawaii's larger economic and social benefit. HCEI+ has a greater cost but even greater benefits than the business as usual reference case.

Work Plan #1 makes key assumptions about implementing HCEI+ goals and the failure to meet the HCEI+ laws, policies, and projects on time poses a major risk to meeting the GHG target. This is true for all work plans (including #2 and #3). Implementing HCEI+ will require flexibility and agility, however, as federal laws regarding greenhouse gases and clean energy are simultaneously developing. For example, the U.S Environmental Protection Agency recently announced proposals to regulate greenhouse gases under the federal Clean Air Act. In addition, the U.S. House of Representatives has passed a bill to regulate greenhouse gases (the framework for Work Plan #3).

The Task Force notes that in the public workshops, agriculture representatives repeatedly sought support for water so that they could grow biofuels in Hawaii to support HCEI+.

The majority of the Task Force members believe it is important that the Legislature Arrange Financial Support for HCEI+. To meet the goals of HCEI+, laws and resources are needed to support its projects over time. In particular, HCEI+ requires large capital investments, and the costs and means of funding projects pose major unresolved issues. While the ICF work plans attempt to quantify the costs of currently prescribed goals of HCEI, the goals are still broad and thus relatively intangible as we move into the future. Although the ICF modeling effort assumes that electric utility ratepayers fund major HCEI projects, some Task Force members recommend that a carbon tax provide a funding base for clean energy projects not provided by private markets. The proper allocation between users/ratepayers, investors, and taxpayers remains to be determined and needs careful further consideration.

In considering how to distribute the cost burdens of energy security and climate change policies, it is important to consider how possible results are achieved. For example, raising electrical rates may encourage large customers to leave the electrical system and push the economic burden on the remaining ratepayers, who are often residential, small business and low-income customers who have the most

limited options and resources. In the financing of key infrastructure where benefits cannot be easily apportioned, it may be preferable to raise finance from the tax base.

While HCEI+ will require major funding, Hawaii now pays about \$5 billion to \$7 billion per year to import fossil fuels, mostly oil. The more energy efficiency and use of local renewable energy Hawaii can implement, the more money we can keep and invest in the state. There are many ways to support HCEI+, including laws and policies. For legal support, the majority of the Task Force recommends that the Legislature enact laws to implement and assure that HCEI+ meets its schedule on time. Some major laws to enact are identified below. We look to the HCEI working groups for further information and recommendations.

3a. Adopt or Amend Energy Laws. Section 8 of Act 234 requires the Department of Health (DOH) to adopt rules to implement the work plan and regulatory scheme, but many parts of HCEI+ depend on appropriate state laws on energy efficiency and local renewable energy. The Legislature has already passed important laws in these areas including a more stringent Renewable Portfolio Standard and Energy Efficiency Standard. In addition, information is simultaneously being developed through efforts like the Bioenergy Master Plan. While the Task Force has no specific recommendation for bills but expects the HCEI working groups to make appropriate recommendations, the Task Force strongly insists the life-cycle impact of energy sources be considered in any adopted energy laws. Act 234 requires the Task Force to minimize “leakage” of greenhouse gas emissions. This means that, even though an energy technology may be relatively clean-burning within the boundaries of Hawaii, the process in which it is made elsewhere is also of importance.

3b. Adopt or Amend DOH and/or DoTax Laws. Pursuant to HRS chapter 342B, DOH has the authority to regulate air pollutants and greenhouse gases if designated as an air pollutant, require permits and permit fees, and monitor and enforce its rules. The regulation of greenhouse gases and the assessment of greenhouse gas fees require the adoption of rules. However, any DOH rules need to coordinate carefully with EPA statutes and rules. While EPA proposed in September 2009 to regulate greenhouse gases under the Clean Air Act, it has not yet done so, and Congress may enact a greenhouse gas law. DOH does not have authority to impose a carbon tax independently of air pollution permits. In any event, tax laws are under the jurisdiction and purview of the Department of Taxation (DoTAX), and any carbon tax would require new statutes for DoTAX.

3c. Adopt or Amend Laws To Help Low Income People. Climate change policies, if not carefully crafted, can disproportionately burden low-income households. This possible regressive impact needs to be directly addressed in the basic design of the system. The effect of work plans and the reference case on different ethnic and racial groups was also not modeled by ICF.

3d. Adopt or Amend Laws For Monitoring GHG. Hawaii needs to assure that emissions are in fact being reduced. EPA's new GHG mandatory reporting rule, adopted in September 2009, covers about 10,000 large facilities that account for about 85% of emissions nationally, but the EPA rule only covers about 30-40 facilities in Hawaii. If Hawaii seeks to cover more facilities than EPA, for regulation, taxation, or reporting, and particularly if Hawaii seeks a high performance alternative in any new federal GHG law, then we need to assure that Hawaii has a high quality monitoring system.

3e. Provide a "Backstop" for HCEI+. Because only certain components of HCEI are codified, including stringent renewable portfolio and energy efficiency standards for the electric sector under and Act 155 (2009), the majority of the Task Force recommends that there be a "backstop" or assurance mechanisms to ensure that HCEI+ policies are implemented on time. There should be continuing review if HCEI+ does not meet identified conditions (triggers) or if Congress enacts no federal GHG law, and if further study supports them.

ICF projects that all three work plans will have positive Economic Effects to Hawaii's economy. This is because oil prices are expected to continue rising (based on the U.S. Department of Energy, Energy Information Administration projections) and the large share of oil-dependence within Hawaii's economy. The move toward clean energy sources will provide long-term economic benefits in the form of price security (relative to fluctuating fossil fuel costs), reducing the fossil imports and keeping more dollars in the local economy, as well as greenhouse gas emissions reductions. Under all three work plans, residential consumer electric bills are projected to decrease even though electricity prices increase (due to increased efficiency).¹⁴ It is important to note that within all three work plans, ICF assumes that HCEI components are financed through electricity ratepayers. In addition, within Work Plan #2, the impact to the economy of a carbon tax is based on the assumption that 90% of tax revenues collected would be returned to the tax payer in the form of a lump-sum rebate. From a modeling perspective, this is a similar scenario to having a carbon tax (level to be determined) where a portion of it is spent on HCEI projects and a portion is returned to residents (with the capacity to mitigate impacts on low-income households). The combination of HCEI+ and a state-level carbon tax in Work Plan #2 provides insight into the expected economic costs of HCEI from an economy-wide perspective as well as further benefits of a carbon tax.

However, there are also risks to the economy. The effect of work plans on businesses depends on energy's share of operating costs, business profitability, and its ability to pass costs to consumers. Some small businesses may have a harder time taking advantage of energy efficiency and will need help during a period of adjustment.

¹⁴ This conclusion may need further study, particularly when efficiency is discretionary from a ratepayer perspective.

The issue of a possible carbon tax drew the most comments in public workshops. Transportation and agriculture representatives strongly opposed any carbon tax, and some citizens strongly favored it.

The Legislature should Support HCEI+ In Any Federal GHG Law. Although there is considerable uncertainty about the form of future federal greenhouse gas emissions policy, the Task Force recommends, based on Work Plan #3, that HCEI+ goals be pursued as a compliance mechanism to meet federal goals and policies. Work Plan #3 models both the impact of HCEI+ and a federal cap-and-trade program (based on the current bill form of the American Clean Energy and Security Act, ACES). Given that HCEI+ was shown to be beneficial to Hawaii's economy in Work Plan #1, and ICF identified a number of mechanisms by which Hawaii will receive additional federal funds as a result of the permit revenue, Work Plan #3 shows a positive benefit to Hawaii's economy. Thus it is in Hawaii's best interest to continue to pursue HCEI+ in the face of uncertainty regarding federal legislation. As specified in the current form of ACES, states can pursue clean energy goals beyond that of federal statute with the exception of state and regional-level cap-and-trade programs (which is not here being proposed). The impacts to Hawaii from any potential federal greenhouse gas law should be further analyzed as policies unfold, including the potential of Hawaii to meet future greenhouse gas emissions targets in a cost-effective manner.

4. Additional Questions and Research Needs

4a. Carbon Tax. The majority of the Task Force recommends further research on the implementation of a carbon tax, the optimal price of the tax, and use of tax revenue. A carbon tax is seen by some members of the Task Force as sending an important price signal to discourage the use of fossil fuels, encourage efficient use of fossil fuels, and encourage the use of substitute fuels such as local renewable energy (including HCEI+ projects). It can also be used to mitigate the effects of energy costs on disproportionately burdened households.

Although ICF modeled the effects of a carbon tax to Hawaii's economy within Work Plan #2, it was done in conjunction with HCEI+ (assumed to be funded by ratepayers). Combined with HCEI+, a state-level carbon tax reduces emissions very slightly (20 kt) below HCEI+ levels (4,800 kt). The differences in projected emissions reductions under each of the three work plans remain very small because of the dominance of HCEI+ in each plan.

Consistent with other jurisdictions, ICF assumes a carbon tax rate starting at \$10/tonne CO₂e and moving to \$40/tonne CO₂e over time. This tax equates to roughly \$4/barrel of oil and \$17/barrel of oil but is more broad-based than a "barrel tax" because it would also cover sources such as coal.

The use of Tax Revenue is an important issue that merits further inquiry. In Work Plan #2, ICF recommends returning 90% of the tax revenue to residents through the tax system. This could be done in a lump-sum payment or through adjusting other taxes such that the net effect of a carbon tax is revenue neutral. “Refunds” could be weighted to help low-income people or other groups disproportionately affected by a tax. Compensatory policies involving cash payments, tax credits, subsidies for energy services like bus fares or electricity charges, and special financing programs for energy efficiency measures are a few of the options that might also play a role. Such a program might be funded directly from GHG revenues or through cross subsidies. This is the primary benefit of using the tax system to ensure clean energy for Hawaii rather than solely ratepayers. In addition, a sole emphasis on ratepayers focuses solely on electricity whereas much of Hawaii’s fossil fuel usage is in transportation. For example, ground transportation was found to be the fastest growing emitter in Hawaii’s economy within the ICF inventory report.

A carbon tax could serve as a “backstop” mechanism to ensure the viability of HCEI+ by using it to set a floor on the price of oil. The intent is to provide some financial certainty for renewable energy suppliers similar to the effect of a feed-in tariff for suppliers of renewable power to the electric companies. For this backstop type, the tax would be triggered when price of oil goes down to a set level, to be determined. A carbon tax could also be used as a backstop to achieve GHG emissions reductions that HCEI+ did not. More research would be needed, however, to determine the level of carbon tax necessary to itself meet either HCEI+ targets or Act 234’s GHG target.

There is considerable uncertainty in terms of how a state-level carbon tax may in the future interact with federal greenhouse gas policy, particularly a federal-level cap-and-trade system. One identified concern is that a federal cap and trade system may require spending considerable sums to buy GHG emission allowances. Work Plan #3 estimates that the ACES/Waxman-Markey bill would require payments of about \$212 million in 2012, declining to about \$154 million in 2020 as emissions decline. Many Task Force members recommend that any future federal GHG law allow Hawaii an option to be flexible in how to reduce emissions if it will exceed national emission targets. The impact of this was not modeled, however, and thus the interaction between a federal-level cap-and-trade and a state-level greenhouse gas policy (possible carbon tax) should be further researched.

4b. Carbon Sequestration. Through a sub-committee of the Task Force, a study was conducted on the opportunity for carbon sequestration through Reforestation and Improved Agricultural Management Practices. It was determined that changes in land-use patterns play an important role in greenhouse gas emissions outcomes. In addition, it was determined that there are substantial co-benefits from reforestation projects, including watershed management and native species restoration. The Task Force strongly recommends there be further analysis and consideration of opportunities for the state to sequester carbon and achieve emission offsets through reforestation and certain agricultural management practices. In particular, whether

reforestation initiatives may be an appropriate use of state funds (or carbon tax revenues). These activities have the potential to produce co-benefits for the state's natural resources, watershed and diversified agriculture goals, while contributing to meeting state and federal emission targets. The study report on reforestation options can be found at:

<http://hawaii.gov/dbedt/info/energy/greenhouse/ForestCarbonRpt.pdf>.

4c. Minimize Leakage. Act 234 specifically asserts that the state minimize leakage of greenhouse gas emissions. Currently, the success of HCEI relies heavily upon the state's ability to Obtain or Produce Biofuels for transportation as well as for power production. The Task Force strongly recommends that all inputs into energy sources, i.e. a life-cycle perspective, be considered. This is particularly important for biofuels, as several sources of biofuels have been identified by national and international researchers to not have a positive energy content from a life-cycle perspective. Thus it is important to pursue study on the greenhouse gas impacts of different biofuel sources, both local and imported, and to develop biofuel policy on a life-cycle basis.

Similarly, the impact to the agricultural sector of any energy-related policy (including biofuels or taxation) should be further studied. The vast majority of Hawaii's food and fuel is imported into the State and thus any policy developed should seek to not disadvantage local agricultural producers toward imported sources. As such, the life-cycle impacts of the transportation of agricultural goods should also be further researched.

Additional Concerns

To some members of the Task Force, a carbon tax is viewed as unnecessary, harmful to the economy, and premature. Transportation representatives to the Task Force see an across-the-board tax as particularly harmful to aviation, ground transportation, and local fuel suppliers, especially given a rise in many other ground transportation taxes. They also predict a rise in the prices of the many products transported by their industries. There is concern that a state carbon tax would result in double taxation if a federal cap and trade system is enacted because Hawaii fuel prices are tied to mainland prices by contract and thus not properly harmonized. The carbon tax, as modeled by ICF, is seen as too vague to properly evaluate its application, and therefore needs considerably more study.

There is a need for a better estimate and explicitly detail the costs and benefits of HCEI+, particularly as projects unfold. There is need to refine the analysis of how different sectors of the economy and disproportionately affected people. This is especially true for transportation, which is a major source of GHG emissions.

In regards to air transportation, it was omitted from the scope of Act 234 for a variety of reasons and, in particular, because it covers many jurisdictions. While this seems currently prudent, as air transportation has become more efficient and greenhouse

gas emissions have been reduced since 1990, it remains important to monitor emissions from the air transportation sector and possibly take future action.

5. Conclusions

Based on available information, the Task Force strongly recommends support measures be provided to HCEI+ as a means of achieving energy security and reducing greenhouse gas emissions.

There is much that can be done to reduce GHG emissions with existing legal authority, including efforts in which government leads by example. The Task Force encourages the Legislature and the Executive to augment existing emissions reducing measures and to implement initiatives to reduce its own carbon footprint. In addition, there is need for continuing public outreach and education on this topic.

The Task Force also recommends a reexamination of the emissions target established by Act 234 to determine whether it is an adequate response to the environmental threat and likely federal regulation (which is looking beyond the year 2020). Mounting science indicates that the effects of increased greenhouse gas emissions are impacting our global climate more rapidly and more severely than previously forecast. As an island state, our exposure to climate change makes us uniquely vulnerable to rising sea levels, impacts to fresh water availability, and severe storms, among other things.¹⁵ In addition to needed emissions reductions, the state must adapt to likely climate change impacts. Elements of HCEI+ will enhance our resilience in the face of climate variability and change making it an even more important vehicle in the short term. An examination of current scientific recommendations for emissions reduction may suggest, however, that additional action will ultimately be required.

¹⁵ Although the 2009 legislative session called to establish a Climate Change Task Force to address and plan for impacts of climate change, the Task Force has yet to convene. That Task Force is important to help prepare Hawaii for climate change impacts.